includes a base having a length for supporting the foot, and a first and second side portion extending upwardly from the base along a length thereof. At least one movable laser scanning unit is moveably disposed along the base for determining coordinates of an undersurface of the foot by directing at least one line of laser light along the undersurface. At least one insole-milling station is in communication with the at least one scanning station. The at least one milling station includes a milling assembly for forming the custom-made insole, and control means for controlling the operation of the milling assembly based upon the coordinates determined by the at least one laser scanning unit.

In contrast, Yanagida discloses an automatic engraving system for automatically engraving the lateral contour of a person's face on a medal. Yanagida's system includes, among other things, two cameras 14A and 14B, each disposed at a position offset from the lateral contour of a face by a predetermined angle and two charge coupled devices including a monitor screen on which the lateral contour of the face is displayed and a number of lattice points being arranged on the monitoring screen. The lateral contour of the face is determined by sequentially measuring a width, a height, and a thickness of the lateral contour of the face at a certain actual point on the latter and sequentially processing the dimensional data derived from the measurements.

Yanagida does not disclose or suggest "at least one scanning station for supporting a foot to be measured, the at least one scanning station including a base having a length for supporting the foot, a first and second side portion extending upwardly from the base along a length thereof, and at least one movable laser scanning unit moveably disposed along the base for determining coordinates of an undersurface of the foot by directing at least one line of laser light along the undersurface" as recited in claim 13. As clearly shown in Fig. 3, cameras 12a and 12b are not positioned to scan along the undersurface of a foot that is supported on chair 10. Referring to column 5, lines 36-39, Yanagida explicitly teaches engraving "based on dimensional data on the contour indicative of an upper half of one person or the whole body of one person ***as seen from the front side***" (emphasis added). Thus, Yanagida does not disclose each and every element of the claim.

Moreover, one having ordinary skill in the art would not use the device of Yanagida to scan the undersurface of a body part, whether it be a foot, face etc., supported in a chair. In order to accomplish such a task, Yanagida's system would have to be redesigned, or the user would

have to stand on his/her head, placing his/her foot directly in the path of cameras 12a and 12b. One having ordinary skill in the art would not be motivated to use Yanagida's system in the manner suggested by the Examiner. Therefore, Applicants respectfully submit amended claim 13 is allowable over the cited prior art.

Claims 1, 4, 6 and 7-29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,449,256 to Sundman in view of U.S. Patent No. 5,712,803 to Garuet-Lempirou.

Garuet-Lempirou discloses a system for scanning and digitizing a human foot through a transparent base 40. The foot is enclosed in a support stocking to simulate the pressure of the shoe. See column 1, lines 48-65. The foot

> ***rests on a transparent plate reproducing as closely as possible the shape of the "insole", which is the piece of leather on which the foot rests in a shoe. It is based on a sheet of glass or a similar material. This arrangement enables the closet possible simulation of the way the foot is really supported in a shoe.***

Thus, Garuet-Lempirou teaches digitizing the foot to be in the environment that resembles the shoe as close as possible. Furthermore in Garuet-Lempirou, the object to be imaged is described as being under compression loads, the two examples described are a foot constrained by a shoe and a rubber seal of a car door mechanically constrained by its surroundings. This is stated clearly in the abstract's last sentence, "acquisition and digitization of the surfaces of the transparent wall. Applications include acquiring and digitizing the shape of the human foot or a rubber seal for automobile doors when subjected to compression loads."

Independent claim 1 recites a method of forming a custom-made insole comprising the steps of randomly positioning a foot to be measured on a laser scanning station, and passing at least one laser scanning unit along an undersurface of the foot. The undersurface of the foot is scanned with the at least one laser scanning unit by directing at least one line of laser light along the undersurface. The surface coordinates of the undersurface detected by the at least one laser scanning unit are scanned. The measured surface coordinates are processed and the processed measured surface coordinates are transmitted to a data processing unit. A custom-made insole is milled based on the transmitted surface coordinates.

With the method of the present invention, as recited in claim 1, the foot is imaged in a natural relaxed state, such that the arch of the foot and other portions of the foot, are specifically not under compression. By imaging the foot in a natural state, none weight bearing, non-compressed, we get a "true" image of the normal state of the foot. In this manner, the insole will contain an arch support that conforms to the foot, provides the most natural support, and not visa versa.

In Garuet-Lempirou, a plurality of optical sensors Ca1-Ca4 are attached to a cradle 2. The foot remains immobile on base 40 and cradle 2 with the sensors attached thereto moves along axis A, beneath base 40. See column 5, lines 61-67. The base 40 is calibrated and digitized by removing the wall. With the present invention, the transparent wall is ***not*** digitized and calibration occurs with the transparent plate in place.

Sundman discloses a mill for producing an insole, whereby the contours of the person's foot is measured via a plurality of pins. Thus, it is the position of the pins which is measured and this data forwarded to the mill of the '256 patent.

Applicants respectfully submit that no motivation exists in Sundman for substituting the laser-based measuring system of Garuet-Lempirou for Sundman's pin array. Moreover, such a substitution would render Sundman's device unworkable, as the data recovered from any laser measuring device would not be compatible with the pressure measuring data of Sundman's device, and one having ordinary skill in the art could not "invent" Applicant's claimed invention if presented solely with the teachings of Sundman and Garuet-Lempirou. For these reasons, Applicant's submit that claims 1, 3, 4 and 6-12 are allowable.

Garuet-Lempirou does not disclose or suggest "at least one scanning station including a base having a length for supporting the foot, a first and second side portion extending upwardly from the base along a length thereof," as recited in amended claim 13. The Examiner appears to consider Garuet-Lempirou's cradle 2, to be the mechanical equivalent of Applicants' base. However, the user's foot is not supported on cradle 2, but rather base 40. Base 40 does not have "a first and second side portion extending upwardly from the base along a length thereof," as recited in claim 13.

The Examiner appears to be silent with regard to what she considers to be the mechanical equivalent of Applicant's claimed carrier. Claim 15 as originally presented recites that "the at least one laser scanning unit is mounted to a carrier which is movable along a length of the

base." If the Examiner considers Garuet-Lempirou's cradle to be the mechanical equivalent of the claimed "base", then what is the structure in Garuet-Lempirou that corresponds to the claimed "carrier" of claim 15?

Sundman, like Garuet-Lempirou , also does not disclose or suggest "at least one scanning station including a base having a length for supporting the foot, a first and second side portion extending upwardly from the base along a length thereof," as recited in amended claim 13. Therefore, for the reasons set forth above, Applicants respectfully submit that claims 13-16 and 18-29 are allowable over the cited prior art.

Claim 3 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Sundman in view of Garuet-Lempirou and further in view of the prior art description set forth in the specification at page 8, lines 11-15.

No motivation exists, absent Applicant's own teachings, to modify Garuet-Lempirou to direct "a non-focused fan-shaped line of laser light along the undersurface" of the foot. Nor does the Examiner point to any specific teachings in Garuet-Lempirou or the admitted prior art to which would provide any support for the suggested modification. Therefore, claim 3 is also allowable over the cited prior art.

Claims 1, 7-16 and 20-29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,237,520 to White further in view of Sundman.

With respect to claim 1, neither White nor Sundman disclose or suggest, "passing at least one laser scanning unit along an undersurface of the foot" and "scanning the undersurface of the foot with the at least one laser scanning unit by directing at least one line of laser light along the undersurface." White's scanner unit derives a topographical image of the customer's foot. It is from this image that the 3-D information is derived by determining the lightness and darkness portions of the image.

Sundman does not cure the deficiencies of White, as it does not teach passing a laser scanning unit along the undersurface of the foot, as set forth fully above.

Referring to amended claim 13, none of the cited prior art discloses "at least one scanning station including a base having a length for supporting the foot, a first and second side portion extending upwardly from the base along a length thereof," as recited in the claim.

In summary, none of the prior art either alone or in combination, discloses the claimed subject matter. Therefore claims 1, 7-16 and 20-29 are allowable.

Claims 1, 3, 4 and 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Sundman and further in view of the prior art discussed on page 8 of the present application.

As fully set forth above, neither Sundman nor White disclose passing a scanning unit along the undersurface of the foot with "at least one laser scanning unit by directing at least one line of laser light along the undersurface" as recited in claim 1. Since neither of the primary reference teach passing "at least one line of laser light" no motivation exists, absent Applicants own teachings to pass a "non-focused fan-shaped" line of laser light. Moreover, none of the references disclose "at least one scanning station including a base having a length for supporting the foot, a first and second side portion extending upwardly from the base along a length thereof," as recited in amended claim 13. Therefore, claims 1, 3, 4 and 6 are allowable over the cited prior art.

Given the above, none of the prior art, either alone or in combination, discloses the claimed subject matter. Claims 1, 3, 4, 6-16 and 18-29 are therefore allowable. Applicants respectfully submit that the application is now in condition for allowance and a prompt passage to issuance is therefore earnestly solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact Applicants' undersigned representative.

Respectfully submitted,

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MARKED-UP COPY OF AMENDED CLAIMS

13. (Thrice Amended) A system for forming a custom-made insole, comprising:

at least one scanning station for supporting a foot to be measured, the at least one scanning station including a base having a length for supporting the foot, a first and second side portion extending upwardly from the base along a length thereof, and at least one movable laser scanning unit moveably disposed along the base for determining coordinates of an undersurface of the foot by directing at least one line of laser light along the undersurface;

at least one insole-milling station in communication with the at least one scanning station, the at least one milling station includes a milling assembly for forming the custom-made insole; and

control means for controlling the operation of the milling assembly based upon the coordinates determined by the at least one laser scanning unit.

14. (Amended) The system of claim 13, wherein [the at least one scanning station includes a base for supporting the foot,] the at least one laser scanning unit [being] is movably disposed beneath the base.

15. (Amended) The system of claim [14] 13, wherein the at least one laser scanning unit is mounted to a carrier which is movable along a length of the base.

18. (Amended) The system of claim [17] 13, wherein the base and the first and second side portions are made of tempered glass.

19. (Amended) The system of claim [18] 13, further comprising a plurality of laser scanning units, wherein a laser scanning unit is movably disposed along the base, the first side portion and the second side portion, respectively.